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University of Toronto

COMPUTER SCIENCE NEWSLETTER

No. 93

Edited by C. Alan Ford

Date October 31, 1972

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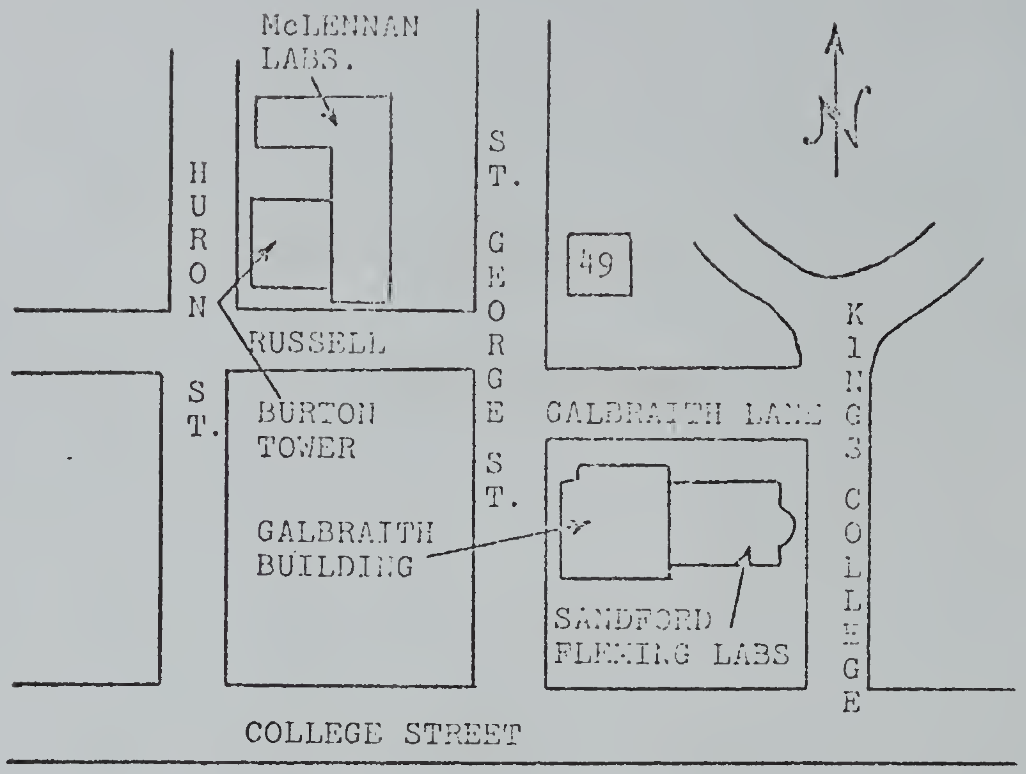
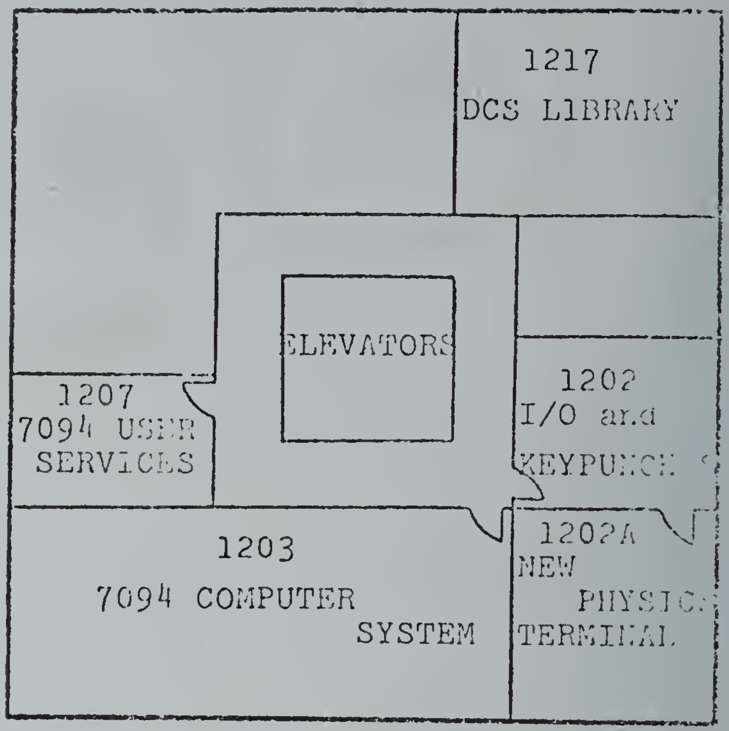
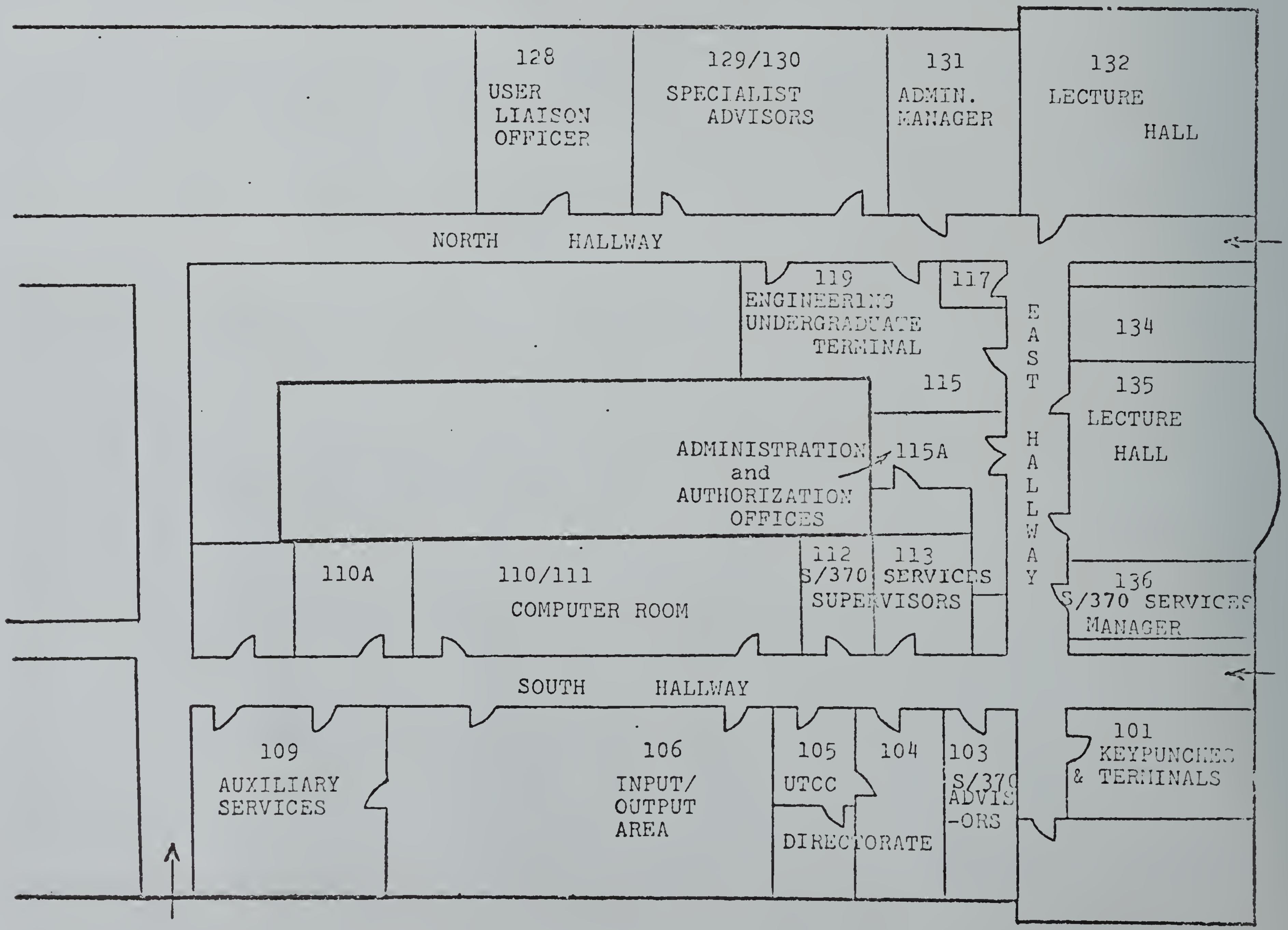




FLOOR PLAN: 12th FLOOR BURTON TOWER

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE
SANDFORD FLEMING LABORATORIES



LATIN AMERICAN UNIVERSITY PROFESSORS' TOUR

J. R. McBride

A group of eighteen Professors, Computer Centre Directors and IBM staff from seven Latin American countries visited the University of Toronto on Wednesday, October 11, 1972. The professors were participating in a North American tour sponsored by IBM. The tour included visits to Mexico City, Los Angeles, University of Michigan, IBM locations in New York State and University of Toronto.

While at the University of Toronto the professors heard talks by Vice-Provost Dr. J.D. Hamilton on "The University of Toronto", Professor A.M. Gordon on "The Latin American Studies Program", Professor T.E. Hull and Professor J.N.P. Hume on "The Academic Program in Computer Science", Dr. J.C. Wilson on "Computing Facilities at the University of Toronto" and Professor C.C. Gotlieb on "Relations between Universities, Governments, National and International Organizations".

The professors also toured the Computer Centre and the Computer Research Facility.

Argentina was represented by Dr. Federico Frischknecht, University of Buenos Aires, Dr. Raul Luccioni, National University of Tucuman and Ing. Walter Monsberger of the University of Cordoba. From Brazil came Ing. Mario Toyotaro Hattori, Federal University of Paraiba, Ing. Ivan Moura Campos, Federal University of Minas Gerais, Dr. Armando Peregrino Seabra Fagundes, Federal University of Rio De Janeiro, Professor Eugenio Leitao de Carvalho de Court, Getulio Vargas Foundation, Professor Jahyr Leal, Federal University of Parana and Ing. Paulo De Moraes of Sao Paulo University. Ing. Maria Cecilia Duque Gomez represented the Colombian Ministry of Education. Dr. Eugenio Rodriguez Vega visited from the University of Costa Rica. Professor Francisco Acevedo , Universidad Catolica Madre y Maestra came from the Dominican Republic. From Ecuador came Dr. Santiago Carrasco, S.J. of the Catholic University, Quito. Venezuelan visitors were Dr. Felipe Martin, Central University of Venezuela and Dr. Ezequiel Vivas Teran from Universidad Caraboro.

PERSONNEL CHANGES

J. Schick

Apologies to Barbara Davis and Carl Williams whom we neglected to welcome in last month's newsletter. Barbara is the new keypunch girl in S/370 Services replacing Josie Troccoli. Carl is replacing Jose Luzadas as mail clerk for the Centre.

Larry Tozer leaves the Centre after three years for employment elsewhere. We wish him the best.

4th ONTARIO UNIVERSITIES COMPUTING CONFERENCE

C. A. Ford

CALL FOR PAPERS: The Ontario Universities will hold their 4th annual conference on computing at The Inn On The Park, Toronto on February 22 and 23, 1973. The Programme Committee invites submission of papers for presentation at the conference.

The conference is open to faculty, staff and students of universities and community colleges as well as individuals from government agencies. It is a forum for the expression of ideas and communication between members of those institutions concerned with policy and programmes for computing in the universities.

The theme for the 4th conference is "Computing Tomorrow: The Influence of the Computer in the University Environment".

The closing date for submissions is December 1, 1972. Six copies of a 500 word abstract should be mailed to:

Programme Committee,
4th Ontario Universities Computing Conference,
c/o Council of Ontario Universities,
102 Bloor St.W.,
Toronto 181, Ontario.

OPTICAL SCANNING MACHINE AT OISE

C. A. Ford

W.A. Goodall, Manager of the Computing Services Group at the Ontario Institute for Studies in Education, has advised that OISE's Optical Scanning Machine DM100 has time available to potential University of Toronto users.

The DM100 can scan 2400 sheets per hour, storing the data onto magnetic tape readable by S/360 or S/370 computers.

All arrangements for use of the equipment are to be made through The Manager, Computing Services Group. OISE (923-6641, ext. 234). Priority will always be given to OISE work. It may be necessary to schedule outside work for evening or weekend hours.

COMPUTER MONITORING WORKSHOPS

C. A. Ford

The fourth section of a continuing series of computer monitoring workshops is being presented on November 17 - 18, 1972 by the Computer Research Center of Brigham Young University. For information on this or future workshops write or telephone:

Glen McClure,
Program Supervisor,
Special Courses and Conferences,
242 HRCB,
Brigham Young University,
Provo, Utah,
84601, U.S.A.

(801) 374-1211, Ext. 3556.

14th CANADIAN-AMERICAN SEMINAR

C. A. Ford

The 1972 Canadian-American seminar will take place in Windsor, Ontario, November 16 - 17, 1972. It's topic is "Information Processing and the Right to Privacy: a crossroads decision for North Americans". The program and list of speakers look very strong. A copy may be seen in Room 105, Sandford Fleming or write to:

The Director,
Canadian-American Seminar,
University of Windsor,
Windsor 11, Ontario.

NEWS FROM THE DEPARTMENT OF COMPUTER SCIENCE

C. Phillips

Physical Sciences Saturday

High School Students are being invited to visit the U. of T. on one of two Saturdays Nov. 25 or Dec. 2 for lectures, displays, and tours of research facilities in the area of Physical Sciences. The Saturday program is being sponsored by the Departments of Astronomy, Chemistry, Computer Science, Mathematics, Physics and the Faculty of Applied Science & Engineering. Invitations are being sent to Chairmen of Mathematics, Science, and Technical Departments in all high schools in Ontario.

The Department of Computer Science will contribute one lecture each day. On November 25, Professor Ken Sevcik will present a talk entitled "Games and Simulations". Professor Denis Tsichritzis will lecture on "Computers: A Toy That Grew Up" on December 2. Professor Ron Baecker will help select and provide some of the films and slides to be shown on computer art. The Computer Centre will help arrange tours of the hardware and interested students will be able to run jobs at the undergraduate High Speed terminals.

New Staff

Professor Ron Baecker is a visiting assistant professor in the area of computer graphics and animation. He received his Ph.D. in 1969 from M.I.T. Professor Baecker's other interests include computer applications to education and the social implications of computing. He is teaching the undergraduate course "Introduction to Computer Graphics" and a graduate course in graphics and animation. One section of the first year course will be taught by Professor Baecker in the spring.

Miss Sue Gerhart is also a visiting assistant professor. She is teaching a graduate course in her area of interest: Programming Languages. In addition she is teaching a section of the first year course. Miss Gerhart received an M.Sc. from Michigan in 1967 and expects to receive a Ph.D. from Carnegie-Mellon shortly. Professors Baecker and Gerhart are cross-appointed from the Computer Systems Research Group.

Dr. George Hall is a visiting associate professor from University of Manchester. Professor Hall's interests lie in numerical analysis, specifically the numerical solution of ordinary differential equations, stiff equations, extrapolation methods, and 2 point boundary value problems.

Branching Out

In August, Branching Out, the long awaited report of the Canadian Computer/Communications Task Force appeared. This report discusses various aspects of the distribution of computer products and services, and presents recommendations on policies which are considered to be desirable for Canada. There are several recommendations of special interest to Universities, e.g. on the sale of services, on networks, and on research programs.

Dr. Hans Von Baeyer, Chairman of the Task Force will be participating in a DCS seminar to be held on Wednesday, November 1, 1972 at 4:00 p.m. in Room 203, McLennan Physical Labs. One purpose of the seminar is to give Dr. Von Baeyer some indication of the reaction to the Task Force report from persons in the university community. Invitations to participate are being sent to a number of University departments, as well as to persons outside the University who, it is thought, may be interested.

To help assure that the audience will be knowledgeable, there will be a preliminary informal discussion on Branching Out on Monday, October 31, 1972 at 4:00 p.m. in Room 103, McLennan Physical Labs. At this time each of the recommendations of the report will be reviewed and arguments for and against them can be voiced.

DCS Students

The fall term is well underway; that first program is a 'fait accompli' for the 940 students taking a first year course; and midterms are just around the corner. At the other end of the spectrum are the 25 fourth year students completing the specialist program and 22 students following the computer science option in Engineering Science.

Enrollment in the courses given through the Division of Extension is around 300. This is an increase over last year partly due to the continued interest in first year courses and to the addition of two new courses "Computer Architecture" and "Information Structures".

Thirty-eight new graduate students are in the Masters program. Three of them are studying on a part-time basis - a new innovation this year. There are 47 Ph.D. students in residence, which is the same number as last year.

RECENT ACQUISITIONS IN THE DCS LIBRARY

Armor, D.J. and Couch, S.A.
The DATA-TEXT primer: an introduction to computerized social data analysis using the DATA-TEXT system.
Cambridge, Mass., Harvard University, July 1971.

Brillinger, P.C. and Cohen, D.J.
Introduction to data structures and non-numeric computation, featuring the WATFOR and WATFIV compilers.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Canada. Department of Communications.
Branching out: report of the Canadian Computer/Communications Task Force. 2v.
Ottawa, May 1972.

Cox, D.R. and Smith, W.L.
Queues.
London, Chapman and Hall, 1961.

Dynkin, E.B. and Yushkevich, A.A.
Markov processes: theorems and problems.
New York, Plenum Press, 1969.

Findler, N.V. and Meltzer, B., eds.
Artificial intelligence and heuristic programming.
New York, American Elsevier, 1971.

Hamming, R.W.
Computers and society.
New York, McGraw-Hill, 1972.

International Symposium on the Theory of Machines and Computations, Technion, Haifa, 1971.
Theory of machines and computations, ed. by Z. Kohavi and A. Paz.
New York, Academic Press, 1971.

Joslin, E.O.
Analysis, design, and selection of computer systems.
Arlington, Va., College Readings, 1971.

Kuo, Shan sun.
Computer applications of numerical methods.
Reading, Mass., Addison-Wesley, 1972.

Lekan, Helen A., ed.
Index to computer assisted instruction. 3d ed.
New York, Harcourt Brace Jovanovich, 1971.

Pollack, Bary W., ed.
Compiler techniques.
Princeton, N.J. Auerbach, 1972.

Princeton Conference on Information Sciences and Systems, 5th, 1971.
Proceedings.
Princeton, N.J., University. Department of Electrical Engineering, 1971.

Saxon, J.A.
COBOL: a self-instructional manual. 2d ed.
Englewood Cliffs, N.J., Prentice-Hall, 1971.

Schwartz, J.T.
Abstract algorithms and a set-theoretic language for their expression.
Preliminary draft, first part.
New York, University. Courant Institute, 1970-1971.

Simon, Herbert Alexander and Siklossy, L. eds.
Representation and meaning: experiments with information processing systems.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Yasuhara, Ann.
Recursive function theory and logic.
New York, Academic Press, 1971.

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https://archive.org/details/computersciencen93cala

HIGH SPEED JOB STREAM NEWS

M. Tapia

With the addition of SPITBOL, the number of language processors available on the High Speed Job Stream has risen to six. The HSJS user can now choose from the following languages:

PLUTO and PL/C - (both dialects of PL/1)

WATFIV - (an implementation of FORTRAN IV language with extensions)

ALGOLW - (the Stanford version of ALGOL 60)

SPITBOL - (a fast version of SNOBOL, a string and pattern matching language)

ASSEMBLER G - (a fast OS/370 assembler language)

SIMON/SAP - (a student assembly and machine language)

Over the summer the following changes were made to High Speed Job Stream processors:

1) The 1972 version of ALGOLW was put onto the system. This version includes better diagnostic assistance and error messages.

2) V2L3 of WATFIV was introduced together with a new job card for WATFIV. The new version allows 8K more core for program and data since the error messages are stored on disk rather than in core.

3) SPITBOL was introduced.

In addition, documentation has been written to describe each of the processors. This is now available as a part of the Userbook from the Information Office. A guide was also prepared for the entire HSJS service. The High Speed guides can be inserted into the general HSJS guide. Each guide outlines the features of the processor and notes any bugs known. Updates will be made periodically and will be available at the Information Office to all persons who own a copy of a High Speed Language Processor guide. Watch for signs at all HSJS terminals announcing any updates.

The advising service has been upgraded for both ASUT and EUT. Advisors are available at both terminals from 10:00-18:00 Monday through Friday. All advisors are competent in WATFIV, PL/C, and PLUTO. Many of the advisors are competent in two or more of the remaining languages. The advisors function is to help the user to decipher error messages, to circumvent bugs in the language processor, and to assist him in any other way which may be necessary except for writing programs or devising algorithms. The advisor is more likely to answer the question of what happened rather than how it happened. While we have carefully screened the advisors, we invite anybody who has a complaint about the advising service to contact Stan Yagi at 928-7331 or Mark Tapia at 928-7109.

Future Plans

Many projects are under consideration or in the development stage.

- we are working on the University of Waterloo WATBOL version of the COBOL compiler and plan to implement it within the next few months;

- we are studying ASSIST, an interpreter for OS/370 assembly language containing student directed error diagnostics, and are considering placing it on the HSJS;

- we are examining various methods of communicating quickly to HSJS users current bugs and problems. An HSJS version of HOTNEWS has been considered and may be implemented if we feel that the printer load can stand just that little bit more;

Any other suggestions (new processors, etc.) are welcome and should be referred to the S/370 User Services Supervisor, Stan Yagi at 928-7331.

HSJS STATISTICS FOR SEPTEMBER

J. Lees

With the return of the fall term students, the expected increase of HSJS has occurred. Recall that the types of jobs are:

WATFIV (W), ALGOL W (G), PL/C (C),
ASMG (A), SIMON (S), LIST & SPITBOL (L).

SPITBOL is now on the system and is presently grouped together with the LIST sub-processor.

PL/C was heavily used (29.8% of the jobs), reflecting the seasonal trends towards certain subprocessors as the various languages are taught throught-out the school year.

Again, the use of HSJS falls off rapidly after 5:00 P.M., a trend which has been consistent for the last year.

```
ALL    JOB SUMMARY  *************  FOR 01-300972
     W      G      C      P      A      S      L    TOT TIME
    77      4     32      0      0     10      0    123  8+WWC
   224      7    101      0      1     15      7    355   |WWWWWWWCCC
   397     31    234      0      8      6      7    683   |WWWWWWWWWWWWWGCCCCCCC
   565     23    352      1     21      0      9    971   |WWWWWWWWWWWWWWWWWWWCCCCCCCCCCC
   685     24    351      4     18      8     22   1112  9+WWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCC
   578     14    473     10     30      6     27   1138   |WWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCA
   628      4    560     17     39     16     26   1290   |WWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCA
   671      7    495     42     18     29     47   1309   |WWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCPL
  1030     11    286      1     26     16     46   1416 10+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCL
   914     12    192      1     27     16     46   1208   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCL
  1151     21    309      4     44     18     50   1597   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCAL
   940     16    333      0     21     17     39   1366   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCL
   923     21    405      0     18     26     70   1463 11+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCLL
   836     31    507     93     25     20     29   1541   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCPPP
   769     28    481    110     36     15     35   1474   |WWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCPPPAL
   959     42    614      0     32     17     49   1713   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCCCAL
   866     14    625      7     24     24     46   1606 12+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCCL
  1022     32    611      6     40     33     52   1796   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCCASL
  1158     19    699      4     31     29     42   1982   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCCCCCAL
  1060     15    609      1     24     12     36   1757   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCCL
   958      8    477      4     24     32     32   1535 13+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCSL
  1226     22    567      4     32     36     36   1923   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCASL
  1191     20    621     10     40     30     24   1936   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCCCAS
  1210     25    574      6     28     31     39   1913   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCSL
   984     28    515     42     15     33     28   1645 14+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCPS
  1024     32    512     10     19     24     62   1683   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCLL
  1016     37    554      5     19     35     74   1740   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCSLL
  1078     33    526      4     38     32     50   1761   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCASL
  1153     30    543     10     22     15     40   1813 15+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCL
  1294     17    500     11     33     19     51   1925   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCAL
  1453     16    561      4     28     18     34   2114   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCL
  1553     25    562     20     28     24     51   2263   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCL
  1393     29    376      4     21     20     56   1899 16+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCL
  1358     25    502     11     23     21     62   2002   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCLL
  1389     24    449     78     25     32     45   2042   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCPPSL
  1558     23    558     16     36     34     49   2274   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCA
   967     21    413      8     13     17     56   1495 17+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCL
   940     18    486      8      7     10     43   1512   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCL
   809     10    463     15      5     11     33   1346   'WWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCL
   650     10    402      5      5     25     28   1125   |WWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCC
   638      6    338      6     14     38     28   1068 18+WWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCS
   539     10    263      0      4     35     13    864   |WWWWWWWWWWWWWWWWWWCCCCCCCCS
   415      3    265      0      1     24     10    718   |WWWWWWWWWWWWWWCCCCCCCCC
   361      5    251     33      1     22     12    685   |WWWWWWWWWWWWCCCCCCCCP
   362      2    258     42      3     62     14    743 19+WWWWWWWWWWWWCCCCCCCCCPSS
   465      6    255      6      6     60     21    819   |WWWWWWWWWWWWWWWWCCCCCCCCSS
   460      6    276      0      5     42     24    813   |WWWWWWWWWWWWWWWWCCCCCCCCCS
   515      7    227      2      8     19     32    810   |WWWWWWWWWWWWWWWWWCCCCCCCCL
   484      8    263      6      4     34     17    816 20+WWWWWWWWWWWWWWWWCCCCCCCCCS
   551      9    312      4     15     53     26    970   |WWWWWWWWWWWWWWWWWWWCCCCCCCCCCS
   529      2    234      1      4     33     11    814   |WWWWWWWWWWWWWWWWWWCCCCCCCCS
   533     12    233      9      4     71     21    883   |WWWWWWWWWWWWWWWWWWCCCCCCCCSS
   472      8    200      0      4     49     12    745 21+WWWWWWWWWWWWWWWWCCCCCCS
   494     12    171      2      5     46     13    743   |WWWWWWWWWWWWWWWWWCCCCCS
   508      9    218     13      4     69     20    841   |WWWWWWWWWWWWWWWWWCCCCCCCSS
   563      9    172     16      9     80     17    866   |WWWWWWWWWWWWWWWWWWWCCCCCCSS
----- ------ ------ ------ ------ ------ ------ ------ 22+---------+---------+---------+---------+---------+---------+---------+
 46565    944  22381    716   1035   1583   1863  75087   0        300       600       900      1200      1500      1800      2100
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S/370 APPLICATION SOFTWARE SUPPORT

W. Hayes

Application Software User Documentation

Section 3.700 Application Software of the new USERBOOK is now available from the Liaison Office (SF-128). This same office has also undertaken to provide a distribution service for supplementary documentation for applications. For some cases, copies are available for examination and perusal; in others, manuals will have to be ordered. This much needed service is a fine addition to the technical support currently provided by the S/370 Application Support Team and will undoubtedly be welcomed by researchers using this software.

Numerical Methods Library

DIFSUB - Differential Equation Solver
This subroutine which integrates both stiff and non-stiff systems using a multistep predictor-corrector method is now available. Documentation is available from the Liaison Office (SF-128).

Statistical Methods Library

An evaluation project is now underway to test various IMSL (International Mathematics and Statistics Library) random number generating routines. A list of routines presently being looked at are:

GGNOR - Generates pseudo normal random numbers.

GGNRF/GGNRF1/GGNRF2 - Produces N single precision pseudo normal (0,1) random numbers on each call.

GGU1/GGU1M - Generates pseudo-random uniform (0,1) deviates (one multiplier).

GGU2/GGU2M - Generates pseudo-random uniform (0,1) deviates (2 multipliers).

Documentation for these routines is available from the Liaison Office (SF-128). For further information phone Len Prepas, ext. 8701.

Optimization Methods Library

ZXPOWL - Modified Powell Algorithm
This subroutine for minimizing a function of several variables is now available in both single and double precision versions. Documentation is available from the Liaison Office (SF-128).

ZXMARQ - Modified Marquardt Algorithm
This subroutine for minimizing the sum of squares of several functions in several variables is now available. Documentation is available from the Liaison Office.

MPSX/MIP - Mathematical Programming System Extended/
Mixed-Integer Programming Option
This IBM Program Product is now being installed. It offers significant extensions over the facilities available with the current MPS Package and will be of interest to all researchers now using MPS. Comments and inquiries concerning this package should be directed to William Hayes, 928-7437.

CALCOMP

A summary of the differences between the UTCC and standard version of LINE and SCALE is available from the Liaison Office (SF 128). Further inquiries concerning these routines should be directed to R. Radcliffe, 928-4924.

DOWNTIMES

J. Lees

The downtimes for August and September are shown for System/370, EUT and ASUT. Although the scheduled production time for August and September did not differ, September saw an increase of 100% in the downtimes. This increase is attributed to hardware problems. September 14, an air-conditioning failure resulted in 350 minutes of downtime. On September 21 a channel error resulted in 292 minutes of downtime and September 24 had 180 minutes of downtime due to a failure to power-up in which emergency maintenance had to be performed by IBM.

Consequently, 822 minutes of downtime in September were caused by hardware failures. The hardware failures are corrected and downtime/re-IPL's are expected to drop to the normal level by October. Power surges accounted for 43 minutes in August and 18 minutes in September.

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                         DOWNTIME REPORT ON SYSTEM370 FOR AUG '72

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|
|
|DAY  RELOADS  DOWNTIME     0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|========================== +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1       3        30      |□□□***************************
|  2       2        22      |□□********************
|  3       5        50      |□□□□□*********************************************
|  4       3        55      |□□□****************************************************
|  5       1        30      |□*****************************
|  6       1        14      |□*************
|  7       0         0      |
|  8       2        35      |□□*********************************
|  9       3        35      |□□□********************************
| 10       1         8      |□*******
| 11       4        50      |□□□□**********************************************
| 12       0         0      |
| 13       0         0      |
| 14       9        74      |□□□□□□□□□*****************************************************************
| 15       0        20      |********************
| 16       3        31      |□□□****************************
| 17       2        70      |□□********************************************************************
| 18       3        27      |□□□************************
| 19       1        10      |□*********
| 20       0         0      |
| 21       0         5      |*****
| 22       6        75      |□□□□□□*********************************************************************
| 23       5        22      |□□□□□*****************
| 24       1        22      |□*********************
| 25       3        21      |□□□******************
| 26       0         0      |
| 27       0         0      |
| 28       2         8      |□□******
| 29       3        38      |□□□***********************************
| 30       1        15      |□**************
| 31       1        12      |□***********
-----------------------------------------------------------------------------------------------------------------------------------

STATISTICS:

    TOTAL TIME DOWN (MIN) .....  779 AVG. PER DAY  25.1
    TOTAL NUMBER OF RELOADS ...   65 AVG. PER DAY   2.1


                         DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************

                         RELOADS REFERS TO THE NUMBER OF RE-IPL'S REQUIRED DUE TO SYSTEM
                         FAILURES AND ARE SHOWN AS RECTANGLES E.G. □□□□


                         DOWNTIME REPORT ON SYSTEM370 FOR SEP '72

-----------------------------------------------------------------------------------------------------------------------------------
|
|
|DAY  RELOADS  DOWNTIME     0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|========================== +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1       4        31      |□□□□***************************
|  2       1        25      |□************************
|  3       0         0      |
|  4    ( CENTRE CLOSED )   |
|  5       3        30      |□□□***************************
|  6       1         6      |□*****
|  7       0         0      |
|  8       1        10      |□*********
|  9       1        10      |□*********
| 10       3        24      |□□□*********************
| 11       3        20      |□□□*****************
| 12       2         9      |□□*******
| 13       3        63      |□□□************************************************************
| 14       2       370      |□□**************************************************************************************************(370)
| 15       3        35      |□□□********************************
| 16       0         0      |
| 17       4        46      |□□□□******************************************
| 18       4        30      |□□□□**************************
| 19       4        43      |□□□□***************************************
| 20       1        10      |□*********
| 21       6       314      |□□□□□□**********************************************************************************************(314)
| 22       6        51      |□□□□□□*********************************************
| 23       0         0      |
| 24       2       185      |□□**************************************************************************************************(185)
| 25       4        43      |□□□□***************************************
| 26       2        20      |□□******************
| 27       7        67      |□□□□□□□************************************************************
| 28       2        20      |□□******************
| 29       5        63      |□□□□□**********************************************************
| 30       3        35      |□□□********************************
-----------------------------------------------------------------------------------------------------------------------------------

STATISTICS:

    TOTAL TIME DOWN (MIN) .....  1560 AVG. PER DAY  53.8
    TOTAL NUMBER OF RELOADS ...    77 AVG. PER DAY   2.7


                         DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************

                         RELOADS REFERS TO THE NUMBER OF RE-IPL'S REQUIRED DUE TO SYSTEM
                         FAILURES AND ARE SHOWN AS RECTANGLES E.G. □□□□
```

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                              DOWNTIME REPORT ON ASUT FOR SEP '72

|
|DAY  RELOADS  DOWNTIME  0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|========================+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1      4        31    |□□□□***************************
|  2      1        25    |□************************
|  3      0         0    |
|  4  ( CENTRE CLOSED )  |
|  5      3        30    |□□□***************************
|  6      1         6    |□*****
|  7      0         0    |
|  8      1        19    |□******************
|  9      1        10    |□*********
| 10      3        24    |□□□*********************
| 11      3        20    |□□□*****************
| 12      2         9    |□□*******
| 13      3        74    |□□□***********************************************************************
| 14      2       365    |□□**************************************************************************************************(365)
| 15      3        35    |□□□********************************
| 16      0         0    |
| 17      4        51    |□□□□***********************************************
| 18      4        30    |□□□□**************************
| 19      4        43    |□□□□***************************************
| 20      1        10    |□*********
| 21      6       314    |□□□□□□**********************************************************************************************(314)
| 22      6        51    |□□□□□□*********************************************
| 23      0         0    |
| 24      2       185    |□□**************************************************************************************************(185)
| 25      4        43    |□□□□***************************************
| 26      2        25    |□□***********************
| 27      6        72    |□□□□□□******************************************************************
| 28      2        50    |□□************************************************
| 29      4        58    |□□□□******************************************************
| 30      3        35    |□□□********************************
-------------------------------------------------------------------------------------------------------------------------------
LAST DAY ENTERED WAS 31  9  72


  STATISTICS:

     TOTAL TIME DOWN (MIN) .....  1615 AVG. PER DAY  55.7
     TOTAL NUMBER OF RELOADS ...    75 AVG. PER DAY   2.6


                              DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. ************

                              RELOADS REFERS TO THE NUMBER OF TIMES THE HIGH-SPEED-JOB-STREAM
                              MONITOR HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. □□□□
```

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                              DOWNTIME REPORT ON ASUT FOR AUG '72

|
|DAY  RELOADS  DOWNTIME  0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95
|========================+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+---
|  1      3        30    |□□□***************************
|  2      2        22    |□□********************
|  3      5        74    |□□□□□*********************************************************************
|  4      2        20    |□□******************
|  5      0         0    |
|  6      1        14    |□*************
|  7      0         0    |
|  8      2        35    |□□*********************************
|  9      3        35    |□□□********************************
| 10      1         8    |□*******
| 11      4.       50    |□□□□**********************************************
| 12      0         0    |
| 13      0         0    |
| 14      6        56    |□□□□□□**************************************************
| 15      0        20    |********************
| 16      3        36    |□□□*********************************
| 17      2        70    |□□********************************************************************
| 18      3        27    |□□□************************
| 19      1        10    |□*********
| 20      0         0    |
| 21      0        15    |***************
| 22      6        76    |□□□□□□**********************************************************************
| 23      5        22    |□□□□□*****************
| 24      1        35    |□**********************************
| 25      3        21    |□□□******************
| 26      0         0    |
| 27      0         0    |
| 28      2         8    |□□******
| 29      2        38    |□□************************************
| 30      1        20    |□*******************
| 31      1        12    |□***********
-------------------------------------------------------------------------------------------------------------------------------
STATISTICS:

   TOTAL TIME DOWN (MIN) ... 754 AVG. PER DAY  24.3              DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************
   TOTAL NUMBER OF RELOADS .  59 AVG. PER DAY   1.9
                                                                 RELOADS REFERS TO THE NUMBER OF TIMES THE HIGH-SPEED-JOB-STREAM
                                                                 MONITOR HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. □□□□□
```

```
                          DOWNTIME REPORT ON EUT FOR AUG '72

------------------------------------------------------------------------------------------------------------------------------------
|
|
|DAY  RELOADS  DOWNTIME        0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|============================= +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1       3         30        |□□□***************************
|  2       1         12        |□***********
|  3       5         50        |□□□□□*********************************************
|  4       2         20        |□□******************
|  5       0          0        |
|  6       1         14        |□*************
|  7       0          0        |
|  8       2         35        |□□*********************************
|  9       3         35        |□□□********************************
| 10       1         10        |□*********
| 11       4         50        |□□□□**********************************************
| 12       0          0        |
| 13       0          0        |
| 14       6         52        |□□□□□□**********************************************
| 15       0         20        |********************
| 16       3         32        |□□□*****************************
| 17       2         70        |□□********************************************************************
| 18       3         27        |□□□************************
| 19       1         10        |□*********
| 20       0          0        |
| 21       0          5        |*****
| 22       6         36        |□□□□□□******************************
| 23       3         42        |□□□***************************************
| 24       1         18        |□*****************
| 25       3         21        |□□□******************
| 26       0          0        |
| 27       0          0        |
| 28       2          8        |□□******
| 29       2         38        |□□************************************
| 30       1         15        |□**************
| 31       1         12        |□***********
------------------------------------------------------------------------------------------------------------------------------------


STATISTICS:

   TOTAL TIME DOWN (MIN) .....  662 AVG. PER DAY  21.4
   TOTAL NUMBER OF RELOADS ...   56 AVG. PER DAY   1.8


                          DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************

                          RELOADS REFERS TO THE NUMBER OF TIMES THE HIGH-SPEED-JOB-STREAM
                          MONITOR HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. □□□□
```

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                          DOWNTIME REPORT ON EUT FOR SEP '72

------------------------------------------------------------------------------------------------------------------------------------
|
|
|DAY  RELOADS  DOWNTIME        0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|============================= +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1       4         31        |□□□□** *************************
|  2       1         25        |□************************
|  3       0          0        |
|  4     ( CENTRE CLOSED )     |
|  5       3         30        |□□□***************************
|  6       1          6        |□*****
|  7       0          0        |
|  8       0          0        |
|  9       0          0        |
| 10       3         24        |□□□*********************
| 11       3         20        |□□□*****************
| 12       2          9        |□□*******
| 13       3         53        |□□□**************************************************
| 14       1        365        |□***************************************************************************************************(365)
| 15       3         35        |□□□********************************
| 16       0          0        |
| 17       4         46        |□□□□******************************************
| 18       4         30        |□□□□**************************
| 19       4         43        |□□□□***************************************
| 20       1         10        |□*********
| 21       6        314        |□□□□□□**********************************************************************************************(314)
| 22       6         51        |□□□□□□*********************************************
| 23       0          0        |
| 24       1        185        |□***************************************************************************************************(185)
| 25       4         43        |□□□□***************************************
| 26       2         20        |□□******************
| 27       6         67        |□□□□□□*************************************************************
| 28       2        230        |□□**************************************************************************************************(230)
| 29       4         50        |□□□□**********************************************
| 30       3         35        |□□□********************************
------------------------------------------------------------------------------------------------------------------------------------


STATISTICS:

   TOTAL TIME DOWN (MIN) .....  1730 AVG. PER DAY  57.7
   TOTAL NUMBER OF RELOADS ...    71 AVG. PER DAY   2.4


                          DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************

                          RELOADS REFERS TO THE NUMBER OF TIMES THE HIGH-SPEED-JOB-STREAM
                          MONITOR HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. □□□□
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IBM SOFTWARE SUPPORT

H. Kugel

IBM supports its software at various levels depending on a variety of technical and marketing factors. IBM has recently lowered to Class=C the level of support of several often-used programs. When a program is defined as Class=C, it is to all purposes unsupported; if a bug is found then, in fact, the user has to get around it as best he can. Naturally UTCC will help to our best ability when such a situation is found.

IBM normally assigns programs to Class=C when they feel:

a) the program has reached, in IBM's opinion, minimum defect level;

or

b) newer or more powerful alternative available.

IBM will drop to Class=C the following programs on December 15:

IEBUPDAT--The alternative here is IEBUPDTE so we expect no user difficulty.

IEBCOMPR--This is used to compare two data sets to see if they are equal. It is seldom if ever used at UTCC.

IEBISAM--This is a general index sequential data set utility. It is at best a clumsy product and UTCC has a substitute. If you are working with ISAM, please call Herb Kugel at 928-7286 if you wish preliminary documentation on the new utility. Proper documentation will be incorporated into a USERBOOK update.

IEBPTPCH--This is a key program, greatly used. There are no outstanding problems with it at present.

ANS COBOL VERSION 2--This is replaced by the Version 3 program product which is available at UTCC. Please phone Herb Kugel at 928-7286 if you wish more information on conversion.

FORTRAN G--This is a very stable key processor, very heavily used. We are currently implementing the FORTRAN G1 program product replacement, and intend fully to keep both processors available indefinitely.

COMPUTER PHYSICS COMMUNICATIONS PROGRAM LIBRARY

S. Yagi

The University of Waterloo has become a subscriber to the Computer Physics Communications Program Library at Queen's University, Belfast. These programs are written in an international source language, at present restricted to FORTRAN or ALGOL, and detailed descriptions are published in the North-Holland journal "Computer Physics Communications" which first appeared in July 1969.

The University of Waterloo through an agreement with Queen's University, Belfast, is able to make available programs in this library to individuals at Canadian Universities. It is felt that this service will reduce the time necessary to receive a program and alleviate Custom's problems. Subscriptions to the entire library, however, must be directed to:

Computer Physics Communications
School of Physics and Applied Mathematics
Queen's University
Belfast 7, Northern Ireland

Requests for programs may be accompanied by a magnetic tape, otherwise the programs will be supplied on cards.

The program decks, including data for the test run, are distributed for each request.

To cover handling charges and distribution costs a charge of $5.00 per program is being made.

Requests should be sent to:

Mrs. S.J. Ward
Computing Centre
University of Waterloo
Waterloo, Ontario

with the following information:

a) Name, address, and phone number (include area code).

b) Program requested (catalogue number) and media--cards or tape. In case of tapes, 800 BPI or 1600 BPI nine track tapes can be requested.

c) Purchase order number.

d) Name and address of person to be invoiced.

S/370 FALL EDUCATION SCHEDULE

R. Cox

The fall schedule of non-credit courses and seminars on computers and computing has now been distributed by System/370 Services and courses and seminars are progressing. If you did not receive a course schedule in the mail and would like one, please phone the receptionist at 928-5270. You may still register in any of the courses scheduled during November. All courses and seminars are available free of charge to all users.

SYSTEM STATUS BULLETINS ISSUED

J. Campbell

52:72:1	New Unit Record Service
53:72:1	Additional Method of Submitting Suggestions
54:72:1	Changes to CRJE
55:72:1	Hours of Service-Thanksgiving Weekend

INTERACTIVE SYSTEMS RELIABILITY

S. Goldfarb

The following table summarizes the time lost out of scheduled hours of production for the period September 1 through September 30, 1972. The total number of scheduled hours of operation during this period was 486 (including the September 4 holiday). There were no late starts (IPL's). The table shows the time lost due to system failures for each of the systems: four unscheduled IPL's were required as a result of the system failures. The uptime for each of APL, ATS and CPS was 99.77%, 99.77% and 99.74%, respectively. In addition to the scheduled hours of operation, APL, ATS and CPS were available during approximately 133, 130 and 130 hours, respectively, of unscheduled weekend time. The power surges, sharp ripples in the electrical supply from Hydro, which affected the ITS/360 also hit many other computers. We are not alone in wanting Hydro to quit blinking.

DATE	DOWN TIME (mins.)			REASON
	APL	ATS	CPS	
Fri. Sept. 1	---	3	---	S80A Abend (software)
Wed. Sept. 13	9	11	13	*Power surge
Fri. Sept. 22	6	---	---	S0C6 Abend (software)
Mon. Sept. 25	12	13	14	*System loop (undetermined)
Wed. Sept. 27	23	24	31	*Power surge
Fri. Sept. 29	16	17	18	*System loop (undetermined)
Totals	66	68	76	*IPL required

System Failures: September 1 to September 30, 1972

2741 TERMINAL ROOM

The Computer Centre sponsors ten 2741 Communications Terminals in the recently renovated Room 101B of the Sandford Fleming Building, 10 King's College Road. This terminal room is available for demonstration workshops of the Computer Centre's Interactive Systems facilities; when not reserved for such a purpose, the terminals are available for public use of the Interactive services. Arrangements for reserving the terminal room should be made with Mr. S. Goldfarb at 928-3787.

CPS PROGRAMS

Several CPS-PL/I functions written by programming personnel from the Department of Zoology are being made available to other CPS users. For a one line description of the functions, type:

```
         LOAD(CATALG,KEYS)PUBLIC
    or   LOAD(CATLG1,KEYS)G11
    and  XEQ
```

Detailed documentation may be obtained through Mr. John Kornatowski, Department of Zoology, 928-2006.

GENERAL NEWS

J. R. McBride

Data Acquisition Survey

CRF is currently conducting a survey of data acquisition requirements on campus. Copies of the survey are being sent to selected departments. Anyone who wishes a copy or has any questions or suggestions regarding its content should contact T.C. Stevens, Rm. SF 2770 or telephone 928-8853.

Visitors from Latin America

A group of 18 University Professors, Computer Centre Directors and IBM staff from Latin America toured the CRF laboratory on Wednesday, October 11, 1972.

For full details of this visit see "Latin American University Professors' Visit" in this Newsletter.

VISITORS TO THE LAB.

The following people visited the CRF lab. between September 21st and October 13, 1972: Mr. D.A. Chisholm, Ottawa, Professor Z. Khawza, University of Calgary, Professor A.K. Dewdrey, University of Western Ontario, Mr. J. Kanehira, Japan External Trade Organization, Tokyo, Professor A.G.J. McFarlane, University of Manchester, England, Miss E. Strike, Miss J. Hibberd, Mr. J. McNab and Mr. F. Babbie, Toronto General Hospital, Dr. F. Frischnecht, Dr. R. Luccioni and Mr. W. Monsberger, Argentina, Dr. A.P.S. Fagundes, Mr. M.T. Hattori, Mr. I.M. Campos, Mr. P. de Moraes, Professor E.L. de Carvalho de Court and Professor J. Leal, Brazil, Ms. M.C.D. Gomez, Colombia, Dr. E.R. Vega, Costa Rica, Professor F. Acevedo, Dominican Republic, Dr. S. Carrasco, Ecuador, Dr. F. Martin and Dr. E.V. Teran, Venezuela, Mr. H.M. Leiserson, IBM Brazil, Mr. J.L. Beltran, IBM Venezuela, Mr. D.F. Dias, IBM South America, Mr. D. Condos and Mr. J. Parker, IBM Canada.

VW01 SONIC DIGITIZER WRITING TABLET

CRF has an SAC Graf-Pen Sonic Digitizing Tablet connected on-line to the PDP 8/I computer. The tablet is used to manually digitize (that is, produce digital X and Y co-ordinate pairs) any form of graphical information that is recorded on paper or film. The tablet can also be used to produce X-Y co-ordinates of freely drawn figures or designs. The available digitizing area is 11" x 11".

The user places his graphical data (paper, film, etc.) on the tablet surface and traces over the lines with the special ball point pen associated with the tablet. For freehand drawing, the user simply places a piece of paper on the tablet and draws the desired picture, which can be a sketch, a schematic, a symbol, a character etc.

The method of operation is as follows. A microswitch in the pen is closed when the pen is pressed down on the tablet. The tablet controller then generates a high voltage which produces a spark in a small spark gap at the tip of the pen. The noise from the spark emission is detected by two microphones, one for each of the X and Y axes and the time lapse from spark emission to detection is accurately measured. The time lapse is proportional to the distance from each microphone to the spark. From this time measurement, an X and Y co-ordinate pair is produced.

The tablet can produce X-Y co-ordinates at a maximum rate of 200 pairs per second. The digital resolution is 10 binary bits in 11 inches, or approximately 100 lines to the inch.

The converted X and Y co-ordinates can be printed, punched on paper tape, written on IBM 9- track magnetic tape, or used immediately as input data by programs running on the PDP-8/I or the 360/44. The paper tape or magnetic tape can also be converted to punched cards.

This system is useful for those researchers who record experimental data on film, strip charts, X-Y plotters etc., but who wish to convert their data to digital form for analysis on a digital computer. It is also suitable for persons wishing to obtain accurate X-Y co-ordinates from freehand drawings, or for applications such as processing questionnaire forms where answers have been ticked off in boxes. For further details contact T.C. Stevens in Room SF 2770 or telephone 928-8853.

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	SF105	6496
ASSISTANT DIRECTOR		
C. Alan Ford	SF105	2991
USER LIAISON OFFICER		
Bill Greene	SF128	2694
Information Office	SF134	4990 or 4991
ADMINISTRATION MANAGER		
Jerry Palter	SF131	8948
AUTHORIZATION CLERKS		
Nancy Pocock (S/370 + 7094)	SF115A	8702
Yvonne Davis (Interactive)	49 St.Geo	8703
S/370 SERVICES		
MANAGER		
Dave McNaughton	SF136	6281
INPUT/OUTPUT SUPERVISOR		
Roy Finlayson	SF112	7092
USER SERVICES SUPERVISOR		
Stan Yagi	SF112	7331
PROGRAM ADVISORS	SF103	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094
DEVELOPMENT MANAGER		
Alan Wickens	49 St.Geo	6135

JOB STATUS QUERIES:

SYSTEM/370	7373
7094	7094
Auxiliary Services	6465

INTERACTIVE TERMINAL SYSTEMS:

System Status	6234
APL	7200
ATS	7100
CPS	6200

CONVERSATIONAL REMOTE JOB ENTRY (CRJE)

2741 7233 7381 7386
TTY 7445

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 106/110/111
- provides General Purpose Job Stream and High Speed Job Stream services
- 2048K bytes of core
- 8 disk drives IBM (2314)
- 4 disk drives IBM (3330)
- 1 drum
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 4 card readers
- 2 card punches
- 7 remote batch terminals
- 1 paper tape reader

- OS/MVT with HASP and CRJE

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 100 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UTCC AUXILIARY EQUIPMENT

- located in SF 109
- System/360 Model 20 for unit record services
- CALCOMP plotter (11" and 30")
- card sorter
- decollator
- 519 reproducing punch
- UNIVAC 1710 interpreting keypunch

UNIVERSITY OF TORONTO
COMPUTER CENTRE,
TORONTO, CANADA.